

Engineering With Nature



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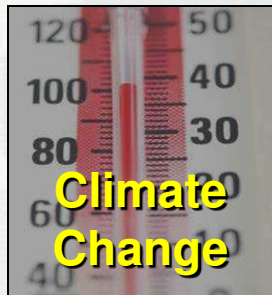
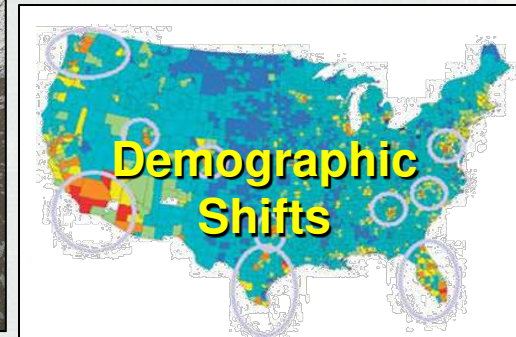
**Headquarters,
U.S. Army Corps of Engineers**



**US Army Corps of Engineers
BUILDING STRONG®**



National Water Resource Challenges



FY 2016 Budget:

- \$2.710 billion for Operation and Maintenance
- \$1.172 billion for Construction
- \$225 million for Mississippi River and Tributaries
- \$205 million for the Regulatory Program
- \$34 million for Flood Control and Coastal Emergencies

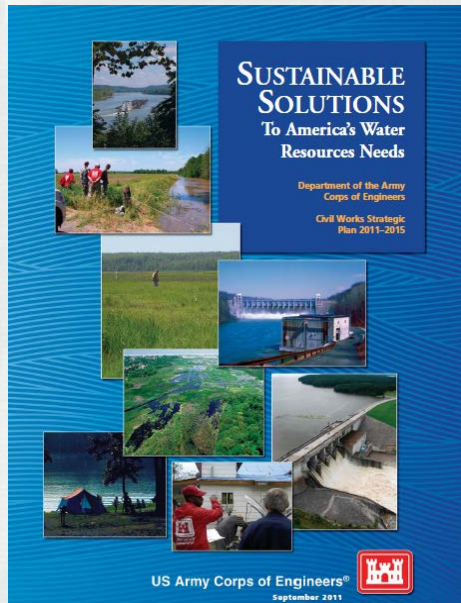


Moving Beyond the *Status Quo*



Needs:

- Efficient, cost effective engineering and operational practices
- More collaboration and cooperation, less unproductive conflict.
 - ▶ Ports, commercial interests, regulators, NGOs, and others
- Sustainable projects. Triple-win outcomes integrating social, environmental and economic objectives.



Sustainable Solutions Vision: "Contribute to the strength of the Nation through innovative and environmentally sustainable solutions to the Nation's water resources challenges."

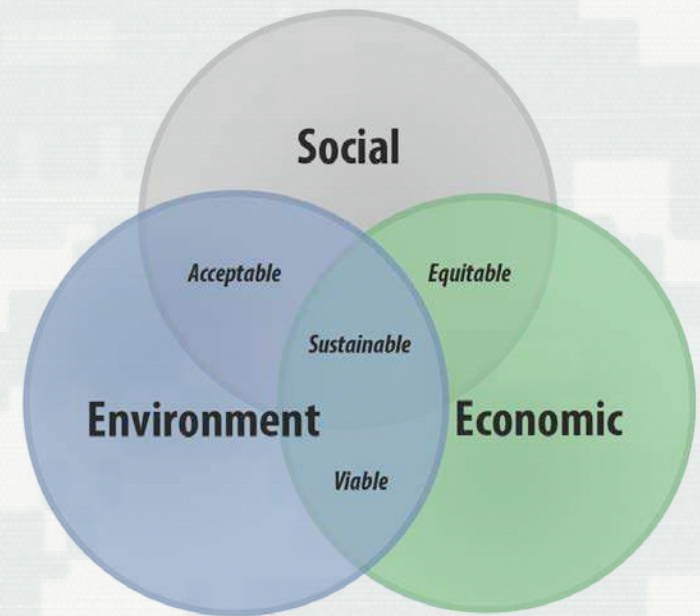


Engineering With Nature...

...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.

Key Elements

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



EWN Status

- *Engineering With Nature* initiative started within USACE Civil Works program in 2010. Over that period we have:
 - ▶ Engaged across USACE Districts (23), Divisions, HQ; other agencies, NGOs, academia, private sector, international collaborators
 - Workshops (>20), dialogue sessions, project development teams, etc.
 - ▶ Implementing strategic plan
 - ▶ Focused research projects on EWN
 - ▶ Field demonstration projects
 - ▶ Communication plan
 - ▶ Awards
 - 2013 Chief of Engineers Environmental Award in Natural Resources Conservation
 - 2014 USACE National Award-Green Innovation



North Atlantic Coastal Comprehensive Study

Natural and Nature-Based Features at a Glance

GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:
STORM INTENSITY, TRACK, AND FORWARD SPEED, AND SURROUNDING LOCAL BATHYMETRY AND TOPOGRAPHY



**Dunes and
Beaches**



**Vegetated
Features:
Salt
Marshes,
Wetlands,
Submerged
Aquatic
Vegetation**



**Oyster and
Coral Reefs**

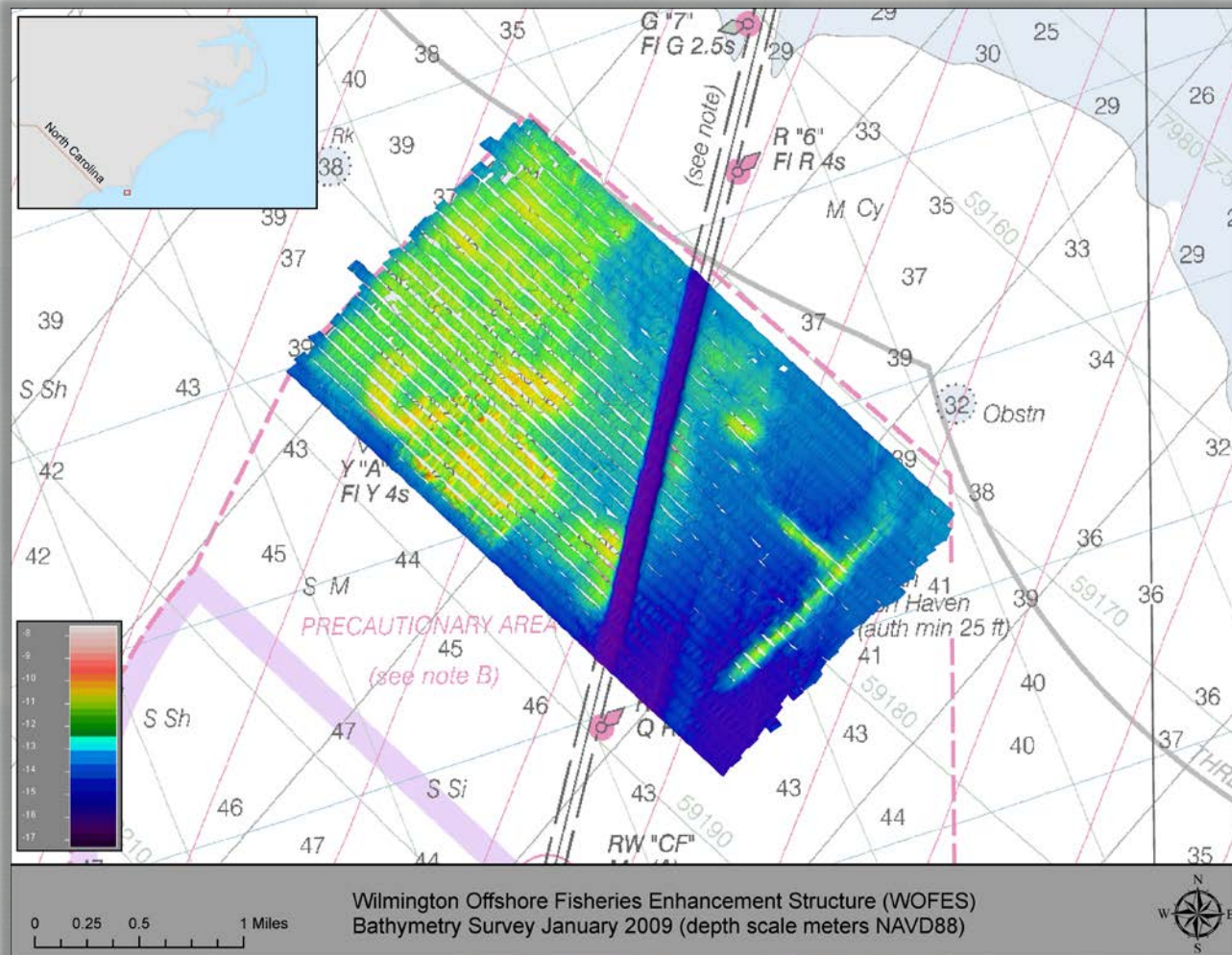


**Barrier
Islands**



**Maritime
Forests /
Shrub
Communities**

Example EWN Solutions



Wilmington Offshore Fisheries Enhancement Structure



Example EWN Solutions

Ashtabula Breakwater Tern Habitat



Example EWN Solutions



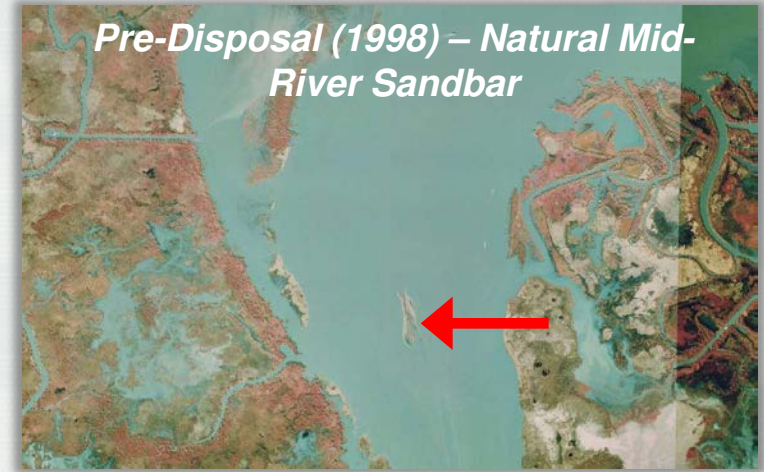
**Upper Mississippi River Training
Structures: Chevrons**



River Bendway Weirs

Example EWN Solutions

- Problem: Dredge deposit areas on the river banks have no more capacity. Available deposit sites are much farther away, and will increase dredging costs
- Solution: Dredge deposit strategically placed *in the river* resulted in a) reduced dredging requirements, b) formation of >90 acres habitat area
- Challenge: Understanding and quantification of physical processes leading to design guidance and application in other river areas.



**Horseshoe Bend on the
Atchafalaya River**





ProMap Online Viewer for EWN



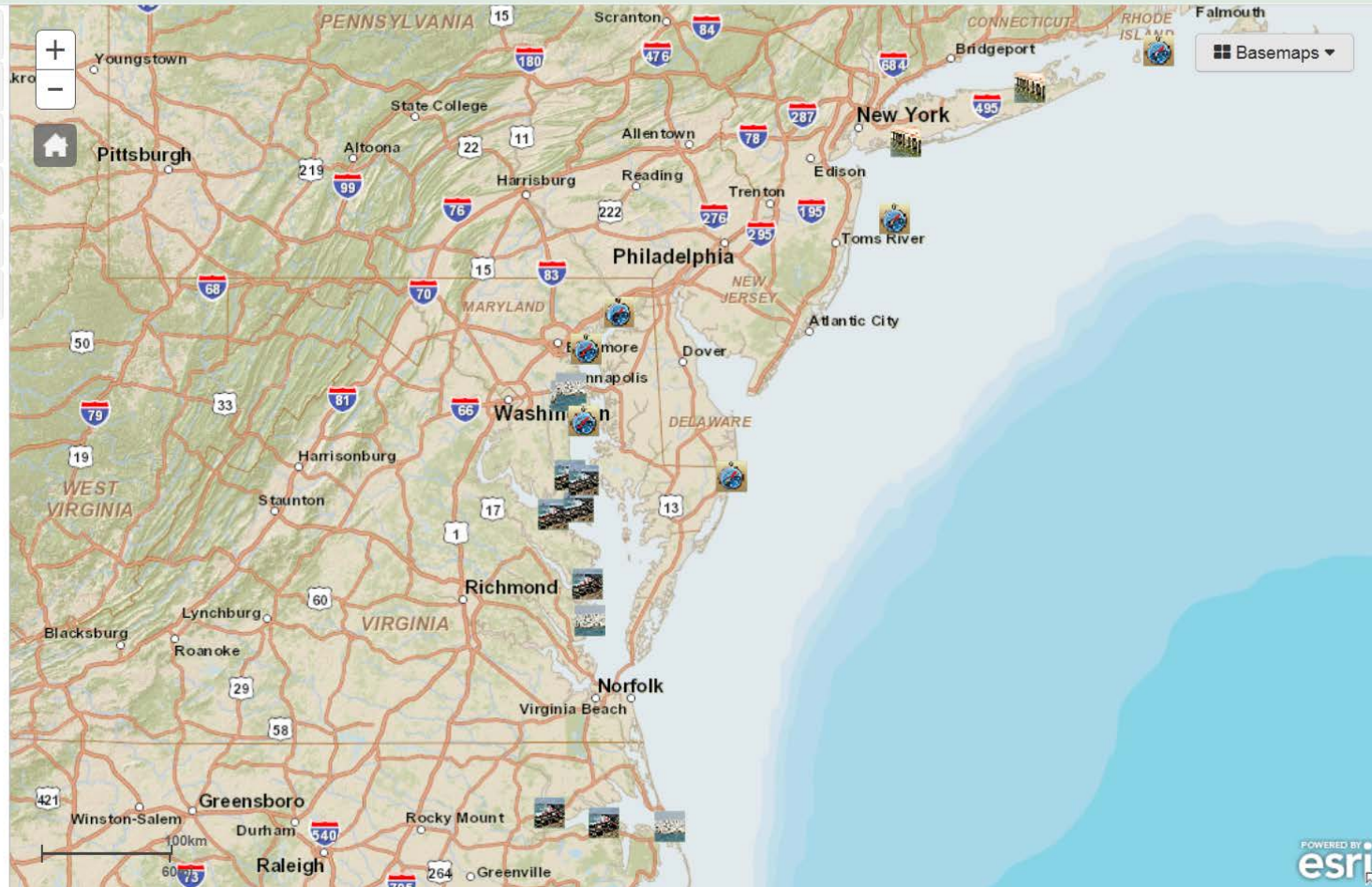
USACE Engineering With Nature

A look at Engineering With Nature Sites



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- ▶ Measure and Locate XY ↻
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<http://gis2.sam.usace.army.mil/applications/opj/v013/>